



CERN
openlab



Extreme®
Connect Beyond the Network

Extreme Flow Optimizer

CERN openlab Technical Workshop 2019

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Project fellow: **Adam Krajewski**

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Project overview (1)

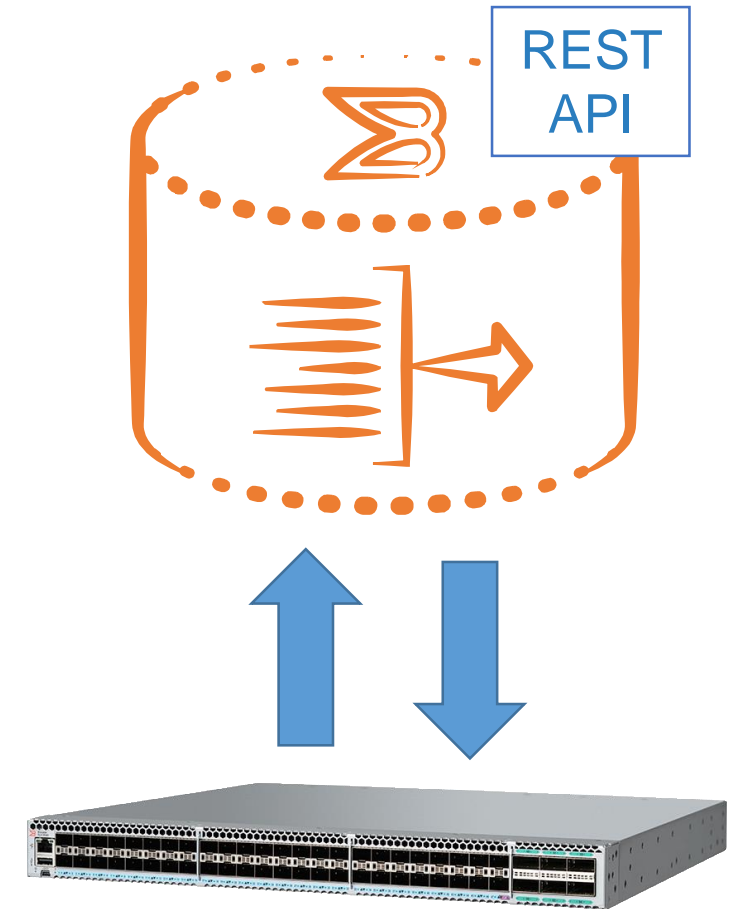
- Initially collaboration between CERN and Brocade
 - Started in June 2015 as a 2-year project
 - Fellow recruited and strongly integrated with Brocade's software development team
 - Initial goal:
 - Get expertise in the Brocade Flow Optimizer (BFO), a Software Defined Networking application
 - Enhance and generalize the BFO software architecture
- Evolution of goals:
 - Adapt BFO to build an intelligent network traffic steering system answering CERN's needs
 - Define use cases and requirements for them:
 - **Intrusion Detection System (IDS) automation**
 - Firewall load-balancing
 - Advanced policy-based routing engine
 - Implement necessary features
 - Enhance BFO software architecture

Project overview (2)

- Project continuation
 - Brocade acquired by Broadcom; Data Center BU acquired by Extreme Networks
 - Successful project handover and extension for the 3rd year
 - Brocade Flow Optimizer becomes Extreme Flow Optimizer (EFO)
- Final goals:
 - Primary focus on the Intrusion Detection System use case
 - Switch SDN focus from OpenFlow to more generic network automation
 - Programmatically leverage proprietary hardware features through open-source platforms
 - Use StackStorm / Extreme Workflow Composer
 - Continue capitalizing on the acquired expertise
 - Further contributions to commercial software development

Extreme Flow Optimizer (EFO)

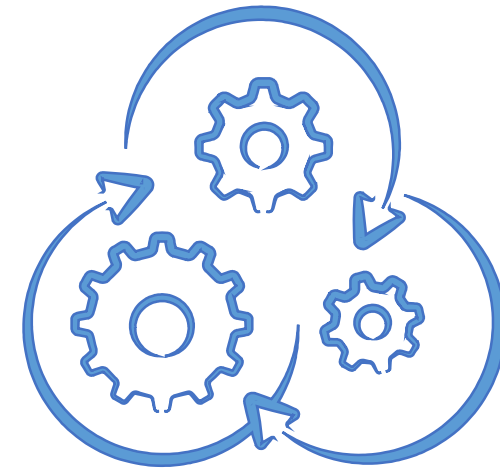
- Software Defined Networking application
- Monitoring large traffic flows and organizing them in a controlled manner
 - Traffic visibility through sFlow
 - Dynamic flow management through OpenFlow or CLI
 - Dropping, redirecting, mirroring, metering... and much more!
 - REST API for northbound integrations
 - Bro plugin developed within the openlab collaboration
- Integration with StackStorm



StackStorm / EWC

Extreme Workflow Composer

- Platform for integration and automation across IT services and tools
 - Python-based & open-source
 - <https://stackstorm.com/>
- Trigger-based workflow execution
 - Sensors listening to events (e.g. syslog)
 - Events translated to Triggers
 - Rules matching Triggers to Actions
 - Workflows grouping Actions together
- Enterprise edition: **Extreme Workflow Composer (EWC)**



Extreme
Workflow
Composer

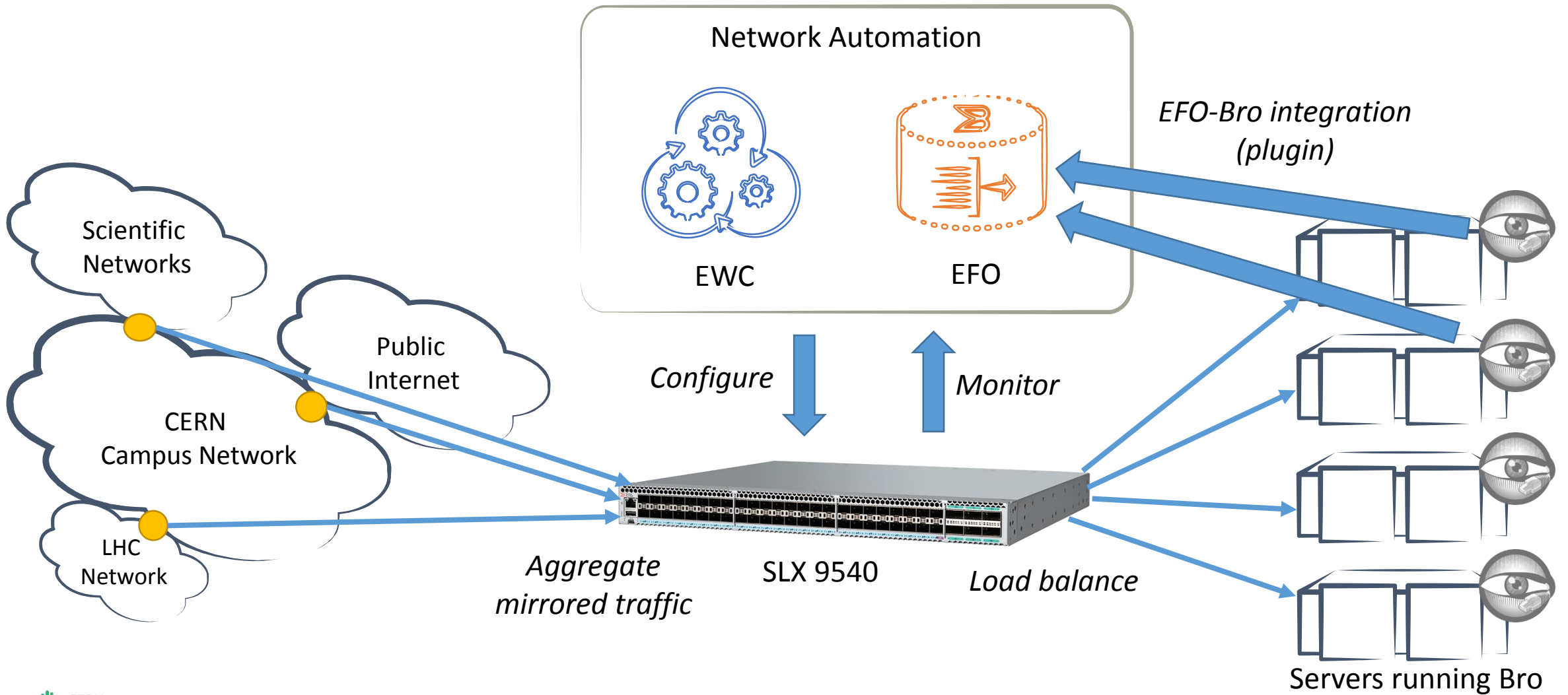
Product contributions

- Nearly 3 years of regular software development effort
 - Full-stack (frontend + backend) developer
 - Reporting to technical managers and product managers
 - Providing occasional technical expertise for customers in Switzerland
- Commercial feature ownerships (design, development, SQA):
 - Bro Integration
 - Palo Alto Networks Integration
 - Arbitrary Bitmask Support for IPv4
 - IP Blacklisting
- Strategic feature involvement:
 - Application tuning for better scalability
 - StackStorm orchestration for Docker

IDS at CERN

- The volume of traffic entering and leaving CERN is growing continuously
- Precise traffic analysis and monitoring is crucial for network security
 - Cyber security threats can be detected and mitigated
- Built a scalable and extensible IDS system at CERN
- Design:
 - Mirror traffic at network boundaries
 - Aggregate and load-balance the traffic across a set of servers
 - Advanced features, enabled by EWC and EFO
 - Symmetrical load-balancing
 - Traffic shunting

IDS setup



Project end and outcome

The project ended in October 2018

- Numerous EFO software enhancements done by openlab fellow
- Ultimate result: upgraded, scalable IDS system for CERN
 - In production since the end of 2018
 - Relies on a traffic orchestrator leveraging Extreme Networks technology
 - Hardware: SLX family
 - Software: EFO and EWO platforms
- Yet another successful example of how openlab enables win-win collaborations between CERN and industry partners.



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Questions?

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